REMARKS

Applicants' Present Claims

The present claims are directed to a high tensile cold-rolled steel sheet consisting essentially of 0.04 to 0.13% C, 0.3 to 1.2% Si, 1.0 to 3.5% Mn, 0.04% or less P, 0.01% or less S, 0.02 to 0.07% Al, 0.005% or less N, 0.2% or less Cr, by mass, and a balance of Fe and inevitable impurities; having a microstructure containing 50% or larger area percentage of ferrite and 10% or larger area percentage of martensite, and having a ratio of intervals of the martensite in the rolling direction to those in the sheet thickness direction of 0.85 to 1.5; and having a nano strength of the martensite of 8 GPa or larger (see applicants' present claim 1).

The present claims also pertain to a method for manufacturing a high tensile cold-rolled steel sheet, comprising the steps of: hot-rolling a steel slab consisting essentially of 0.04 to 0.13% C, 0.3 to 1.2% Si, 1.0 to 3.5% Mn, 0.04% or less P, 0.01% or less S, 0.02 to 0.07% Al, 0.005% or less N, 0.2% or less Cr, by mass, and a balance of Fe and inevitable impurities, into a steel sheet, followed by coiling at a coiling temperature ranging from 450°C to 650°C; cold-rolling the coiled steel sheet at a cold-rolling reduction ranging from 30 to 70%; annealing the cold-rolled steel sheet by heating to a temperature range of [the

coiling temperature + the cold-rolling reduction percentage x 4.5] to [the coiling temperature + the cold-rolling reduction percentage x 5.5] (°C); and cooling the annealed steel sheet to a temperature of 340°C or below at an average cooling rate of 10°C/s or higher, thereby manufacturing a high tensile cold-rolled steel sheet having a microstructure containing 50% or larger area percentage of ferrite and 10% or larger area percentage of martensite, and having a ratio of intervals of the martensite in the rolling direction to those in the sheet thickness direction of 0.85 to 1.5; and having a nano strength of the martensite of 8 GPa or larger (see applicants' present claim 5).

The steel sheets provided by applicants' present claims are desirably used as reinforcing members of pillars and dashboards of automobiles.

Obviousness Rejection Under 35 USC 103

Claims 1 to 8 were rejected under 35 USC 103 as being unpatentable over US 2003/0047256 for the reasons set forth in item no. 6 beginning at the bottom of page 2 and continuing to the top of page 6 of the Office Action.

It was admitted in the Office Action that US 2003/0047256 differs from applicants' claim 1 because it does not specifically

teach the ratio of intervals of the martensite in the rolling direction to those in the sheet thickness direction or the nano strength of the martensite.

It was also admitted in the Office Action that applicants' claim 5 differs from US 2003/0047256 for the following reasons:

(a) US 2003/0047256 does not teach the formula of the annealing temperature range recited in applicants' claim 5 and

(b) US 2003/0047256 does not specifically teach the ratio of the intervals of the martensite in the rolling direction to those in the sheet direction or the nano strength of the martensite.

The positions were taken in the Office Action that the presently claimed invention is obvious over US 2003/0047256 because the steel sheet of applicants' claim 1 and the method of applicants' claim 5 overlap with the steel sheet of US 2003/004725 in terms of chemical composition and manufacturing process, thereby substantially the same steel sheet would have been obtained.

Applicants respectfully disagree with the above positions for the following reasons.

According to the manufacturing method recited in applicants' claim 5 of the presently claimed invention, there is specified a step of annealing by heating a cold-rolled steel sheet to a temperature range covering from "[the coiling temperature + the

cold-rolling reduction percentage x 4.5] (°C)" to "[the coiling temperature + the cold-rolling percentage x 5.5] (°C)". This temperature range is extremely narrow and the manufacturing conditions of US 2003/004725 almost never satisfy the aforesaid temperature range. None of the steel sheets of US 2003/0047256 manufactured by the aforesaid manufacturing condition has a microstructure containing 10% or larger area percentage of martensite as specified in applicants' claim 1. Moreover, it is absolutely not possible with the method disclosed in US 2003/004725 to obtain a high tensile cold-rolled steel sheet having a 0.85 to 1.5 of ratio of intervals of the martensite in the rolling direction to those in the sheet thickness direction, and having a nano strength of the martensite of 8 GPa or larger.

Enclosed is a Table entitled "Table showing US '256's steel sheet, being outside the range of technical art of the present invention" (4 sheets).

The enclosed Table exhibits the results of investigations as to whether or not the annealing temperature range of US 2003/0047256 ("US '256") is within the range of applicants' claim 5. Out of the entire 49 examples in the enclosed Table, there are no more than 10 examples which are within the annealing temperature range of applicants' claim 5. Furthermore, of these

10 examples, no steel sheet has a 10% or larger area percentage of martensite.

The steel sheet of the presently claimed invention has a particularly excellent crashworthiness and its manufacturing conditions are confined to an extremely narrow range. In fact, there are absolutely no steel sheets disclosed in US 2003/0047256 which simultaneously satisfy the manufacturing method and the steel structure of the steel sheet of the presently claimed invention.

Furthermore, it is not possible, according to the method disclosed in US 2003/0047256, to manufacture a high tensile cold-rolled steel sheet which satisfies a microstructure having 0.85 to 1.5 of ratio of intervals of the martensite in the rolling direction to those in the sheet thickness direction, and having a nano strength of the martensite of 8 GPa or larger, as recited in applicants' claims.

Withdrawal of the 35 USC 103 rejection is thus respectfully requested.

Reconsideration is requested. Allowance is solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the

undersigned at the telephone number given below for prompt action.

Respectfully submitted,

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Enclosure: Table showing US '256's steel sheet being outside the range of technical art of present invention (4 sheets)

Table showing US'256's steel sheet, being outside the range of technical art of present invention

Condition of Table 2 of US '256

Ingredient	Coiling temperature / ℃	Cold rolling reduction (%)	Lower limit of annealing temperature, present application Cooling temperature + cold rolling reduction x 4.5	Upper limit of annealing condition, present application Coiling temperature + cold rolling reduction x 5.5	Annealing temperature / ℃	Relationship of annealing conditions between present application and cited document	Second phase	Relationship to present application
A	540	65	833	898	700	Outside the range	P (pearlite)	Annealing condition & structure are different from present application
	520	67	822	889	770	Outside the range	M (martensite)	Annealing condition is different from present application, hence, M distribution is also different.
	500	54	743	797	800	Outside the range	B (bainite)	Annealing condition & structure are different from present application
B	600	50	825	875	700	Outside the range	P	Annealing condition & structure are different from present application
	790	58	1051	1109	720	Outside the range	P,M	Annealing condition is different from present application, hence, M distribution is also different.
C	450	69	761	830	770	Inside the range	B	Structure is different from present application.
D	500	42	689	731	800	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
E	480	46	687	733	720	Inside the range	P,B	Structure is different from present application.
F	430	46	637	683	770	Outside the range	B	Annealing condition & structure are different from present application
	500	80	860	940	840	Outside the range	B,M	Annealing condition is different from present application, hence, M distribution is also different.
G	510	50	735	785	800	Outside the range	B	Annealing condition & structure are different from present application
	520	43	714	757	770	Outside the range	B	Annealing condition & structure are different from present application
H	520	71	840	911	730	Outside the range	P	Annealing condition & structure are different from present application
I	520	67	822	889	750	Outside the range	P	Annealing condition & structure are different from present application
J	520	43	714	757	750	Inside the range	P	Structure is different from present application.

Condition of Table 5 of US '256

Ingredient	Coiling temperature / °C	Cold rolling reduction (%)	Lower limit of annealing temperature, present application Coiling temperature + cold rolling reduction x 4.5	Upper limit of annealing condition, present application Coiling temperature + cold rolling reduction x 5.5	Annealing temperature / °C	Relationship of annealing conditions between present application and cited document	Second phase	Relationship to present application
K	520	45	723	768	780	Outside the range	P,B	Annealing condition & structure are different from present application
	760	45	963	1008	800	Outside the range	P	Annealing condition & structure are different from present application
	520	50	745	795	810	Outside the range	P,B	Annealing condition & structure are different from present application

Condition of Table 9 of US '256

Ingredient	Coiling temperature / °C	Cold rolling reduction (%)	Lower limit of annealing temperature, present application Coiling temperature + cold rolling reduction x 4.5	Upper limit of annealing condition, present application Coiling temperature + cold rolling reduction x 5.5	Annealing temperature / °C	Relationship of annealing conditions between present application and cited document	Second phase	Relationship to present application
1	540	68.8	850	918	770	Outside the range	P	Annealing condition & structure are different from present application
	540	62.5	821	884	800	Outside the range	P	Annealing condition & structure are different from present application
	540	72.4	866	938	840	Outside the range	P	Annealing condition & structure are different from present application
2	540	70	855	925	820	Outside the range	P,B	Annealing condition & structure are different from present application
3	520	56.3	773	830	820	Inside the range	P	Structure is different from present application.
4	520	62.5	801	864	820	Inside the range	P,B	Structure is different from present application.
5	520	53.8	762	816	820	Outside the range	P	Annealing condition & structure are different from present application

6	520	61.5	797	858	800	Inside the range	P	Structure is different from present application.
7	520	61.5	797	858	800	Inside the range	P	Structure is different from present application.
8	480	61.5	757	818	800	Inside the range	P	Structure is different from present application.
9	480	53.8	722	776	800	Outside the range	P	Annealing condition & structure are different from present application
10	480	53.8	722	776	790	Outside the range	P	Annealing condition & structure are different from present application
1	520	72.4	846	918	800	Outside the range	P	Annealing condition & structure are different from present application
	520	72.4	846	918	920	Outside the range	P	Annealing condition & structure are different from present application
	720	72.4	1046	1118	800	Outside the range	P	Annealing condition & structure are different from present application

Condition of Table 12 of US '256

Ingredient	Coiling temperature / °C	Cold rolling reduction (%)	Lower limit of annealing temperature, present application Coiling temperature + cold rolling reduction x 4.5	Upper limit of annealing condition, present application Coiling temperature + cold rolling reduction x 5.5	Annealing temperature / °C	Relationship of annealing conditions between present application and cited document	Second phase	Relationship to present application
11	520	62.5	801	864	740	Outside the range	P	Annealing condition & structure are different from present application
	520	66.7	820	887	750	Outside the range	P	Annealing condition & structure are different from present application
	540	65	833	898	760	Outside the range	P	Annealing condition & structure are different from present application

Condition of Table 16 of US '256

ngredient	Coiling temperature / ℃	Cold rolling reduction (%)	Lower limit of annealing temperature, present application Coiling temperature + cold rolling reduction x 4.5	Upper limit of annealing condition, present application Coiling temperature + cold rolling reduction x 5.5	Annealing temperature / ℃	Relationship of annealing conditions between present application and cited document	Second phase	Relationship to present application
A	680	67	982	1049	800	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
B	650	65	943	1008	800	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
C	670	65	963	1028	810	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
D	660	55	908	963	815	Outside the range	MOB	Annealing condition is different from present application, hence, M distribution is also different.
E	550	67	852	919	790	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
F	680	55	928	983	810	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
G	550	55	798	853	750	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
H	550	55	798	853	815	Inside the range	M (fraction 7%),B	Volume fraction of martensite is less than 10%, hence, different from present application.
I	500	60	770	830	795	Inside the range	M (fraction 5%)	Volume fraction of martensite is less than 10%, hence, different from present application.
J	600	54	843	897	820	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
K	580	55	828	883	790	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
L	680	68	986	1054	780	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
M	550	52	784	836	780	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.
N	660	55	908	963	815	Outside the range	M	Annealing condition is different from present application, hence, M distribution is also different.